Radiotron
REPLACEMENT GUIDE

RADIOTRON REPLACEMENT GUIDE

JULY, 1941.

In September, 1940, the "Radiotron Equivalent Type Chart" was first announced. This chart proved extremely popular and a complete reprint was necessary in January, 1941. Owing to the large number of types listed it was quite impossible to give detailed information as to the differences between individual types.

The "Radiotron Replacement Guide," here presented, gives more or less detailed instructions for replacing over 100 different types, now no longer available, with valves of Australian Manufacture.

The Australian-made range of receiving valves now totals 58 types, as follows:

1A4–P	1J6–G	5Y3–G	6J8–G	42
1A7–GT	1K4	6A7	6K7–GT	45
1B5–25S	1K5–G	6A8–G	6K8–G	47
1C4	1K6	6B6–G	6U7–G	57
1C6	1K7–G	6B7	6V6–G	58
1C7–G	1L5–G	6B7S	6X5–GT	75
1D4	1M5–G	6B8–G	19	77
1D5–GP	1N5–GT	6C6	24A	78
1D8–GT	1P5–GT	6D6	30	80
1H4–G	1Q5–GT	6F6–G	32	83V
1H5–GT	2A5	6G8–G	34	
1H6–G	5V4–G	6J7–G	35	

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Valves of Australian manufacture will, in all cases, replace directly valves manufactured overseas bearing the same type number. In addition, they will replace directly a number of other types as follows:

Type	Replace with Radiotron	Type	Replace with Radiotron	Type	Replace with Radiotron	Type	Replace with Radiotron
AC22	24A	88–S	6D6*	235	35	432	32
24	24A	95	2A5	245	45	434	34
K24	24A	124	24–A	247	47	435	35
24–S	24A*	130	30	280	80	442	42
25S	1B5/25S	132	32	313	80	445	45
KR–25	2A5	134	34	313–B	80	447	47
42–A	42	135	35	324–A	24A	457	57
47–S	47	145	45	330	30	458	58
51	35	147	47	332	32	480	80
51–S	35*	180	80	334	34	551	35
57–S	57*	213	80	335	35	986	83V
58–S	58*	213–B	80	345	45	7000	6J7–G
75–S	75*	224–A	24A	347	47	7700	1603
85–S	85*	230	30	380	80	D1	80
88	83–V	232	32	424–A	24–A	PZ	47
88–M	6U7–G*	234	34	430	30	RE1	80

*Add close-fitting valve shield.

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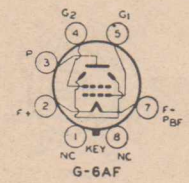
TYPES: 1A5-G, 1A5-GT.

Replace by Australian-made

RADIOTRON 1Q5-GT.

Same base connections (octal 7 pin base):



G-6AF

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Grid
Pin 7. Filament –
Pin 8. No connection.

The only change which is necessary in most cases is to increase the grid bias from –4.5 volts for the 1A5–G(T) to –6.75 volts for the 1Q5–GT, the load resistance being unchanged. The filament current of the 1Q5–GT is 0.1 amp. as compared with 0.05 amp. for type 1A5–G(T). This is of no serious consequence with 1.4 volt receivers, but in most cases the 1Q5–GT could not be used in a series filament circuit as for battery/A.C. receivers.

If it is desired to make use of the higher output power available (at the expense of higher B battery drain) from the 1Q5–GT, this may be done by leaving the grid bias at –4.5 volts and by changing the loudspeaker transformer to give a load of 8,000 ohms, the output power being 270 mW, as compared with 115 mW. for the 1A5–G.

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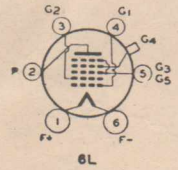
TYPE 1A6.

Replace by Australian-made

RADIOTRON 1C6.

Same base connections (small 6 pin base):



6L

Pin 1. Filament +
Pin 2. Plate
Pin 3. Oscillator Anode
Pin 4. Oscillator Grid
Pin 5. Screen
Pin 6. Filament –
Cap. Signal Grid.

Type 1C6 may in many cases be used as a direct replacement for type 1A6. In other cases where the oscillator anode is fed directly from the maximum high tension voltage it may be necessary to add a series resistance of 20,000 ohms with a 0.1 μF bypass condenser between the "B+" connection on the oscillator coil and earth. The filament current, however, is 0.12 amp. as compared with 0.06 amp. for type 1A6. The higher filament current may introduce difficulties in a sries filament arrangement but is of no consequence (apart from A battery drain) in a 2 volt receiver.

Type 1C6 will, in general, give slightly better performance on the broadcast band than will type 1A6. On the shortwave band, however, type 1C6 is very much superior.

★ ★ ★ ★

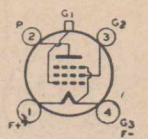
TYPES: 1B4, 1B4-P, 1B4-T.

Replace by Australian-made

RADIOTRON 1K4.

Same base connections (small 4 pin base):

Pin 1. Filament +
Pin 2. Plate
Pin 3. Screen
Pin 4. Filament –
Cap. Grid.



4M

Type 1K4 is slightly longer overall than type 1B4, but the diameters are identical. The principal difference in the characteristics is that the filament current of type 1K4 is 0.12 amp. as compared with 0.06 amp. for type 1B4. In 2 volt receivers this difference in filament current is of no importance, apart from the slight increase in A battery drain.

As R.F. pentodes, type 1K4 is normally used at zero bias with a screen voltage of 67.5 volts, while type 1B4 is normally operated at a bias of –3 volts. If type 1K4 is operated with a bias of –2 volts it will have a similar transconductance to that of the 1B4 at –3 volts.

As triodes (with plate connected to screen) type 1K4 has a slightly higher amplification factor, thus requiring less bias voltage. The recommended grid bias voltages for type 1K4 as a transformer coupled class A triode are:— –3 volts for 90 volts supply; –4.5 volts for 135 volts supply and –6 volts for 180 volts supply.

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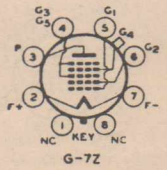
TYPES: 1B7-G, 1B7-GT.

Replace by Australian-made

RADIOTRON 1A7-GT.

Same base connections (octal 8 pin base):

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Oscillator grid
Pin 6. Oscillator anode
Pin 7. Filament –
Pin 8. No connection
Cap. Signal grid.



G-7Z

Type 1A7–GT is of the same overall dimensions as type 1B7–GT. and has a shorter length than type 1B7–G.

Type 1A7–GT draws only half the filament current of type 1B7–G(T), and there is thus an economy in its use. In series filament circuits it should be paralleled with a 26 ohm resistor. Type 1A7–GT has a smaller B battery drain than type 1B7–G(T) and there is thus a further economy in its use. It has, however, a sharp cutoff characteristic and care should be taken to avoid overloading if it is used in close proximity to a station.

Difficulty may also be experienced in maintaining oscillation on the shortwave band. This may be avoided by changing the oscillator coil to one suitable for the 1A7–GT. Alternatively the plate and anode-grid voltage of the 1A7–GT may be increased by 9 or 13.5 volts by the use of a separate battery, or the supply voltage of the whole receiver may be increased to 105 volts (45 + 60). In the latter case it may be necessary to increase the bias on the output valve.

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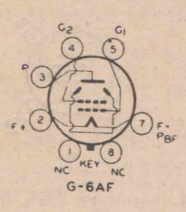
TYPES: 1C5-G, 1C5-GT.

Replace by Australian-made

RADIOTRON 1Q5-GT.

Same base connections (octal 7 pin base):



G-6AF

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Grid
Pin 7. Filament –
Pin 8. No connection.

Type 1Q5–GT has the same overall dimensions as type 1C5–GT, and is shorter in length than type 1C5–G.

The only change necessary is a change in bias from –7.5 volts for the 1C5–G to –5 volts for the 1Q5–GT. If still higher output is required, the bias on the 1Q5–GT may be reduced to –4.5 volts, at the expense of slightly higher B battery drain.

The filament currents of the two types are identical.

Type 1C5–G may also be replaced by the English-made type N14/1C5–G.

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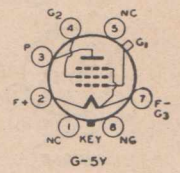
TYPES: 1E5-G, 1E5-GP, 1E5-GT.

Replace by Australian-made

RADIOTRON 1K5-G.

Same base connections (octal 7 pin base):

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. No connection
Pin 7. Filament –
Pin 8. No connection
Cap. Grid.



G-5Y

Type 1K5–G is slightly longer overall than type 1E5–G, but the diameters are identical. The principal difference in the characteristics is that the filament current of type 1K5–G is 0.12 amp. as compared with 0.06 amp. for type 1E5–G. In 2 volt receivers this difference in filament current is of no importance, apart from the slight increase in A battery drain.

As R.F. pentodes type 1K5–G is normally used at zero bias with a screen voltage of 67.5 volts, while type 1E5–G is normally operated at a bias of –3 volts. If type 1K5–G is operated with a bias of –2 volts it will have a similar transconductance to that of the 1E5–G at –3 volts.

As triodes (with plate connected to screen) type 1K5–G has a slightly higher amplification factor, thus requiring less bias voltage. The recommended grid bias voltages for type 1K5–G as a transformer coupled class A triode are:— –3 volts for 90 volts supply; –4.5 volts for 135 volts supply and –6 volts for 180 volts supply.

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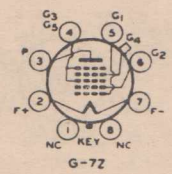
TYPE: 1D7-G.

Replace by Australian-made

RADIOTRON 1C7-G.

Same base connections (octal 8 pin base):



G-7Z

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Oscillator grid
Pin 6. Oscillator Anode
Pin 7. Filament –
Pin 8. No connection
Cap. Signal grid.

Type 1C7–G may in many cases be used as a direct replacement for type 1D7–G. In other cases where the oscillator anode is fed directly from the maximum high tension voltage it may be necessary to add a series resistance of 20,000 ohms with a 0.1μF. bypass condenser between the "B+" connection on the oscillator coil and earth. The filament current, however, is 0.12 amp. as compared with 0.06 amp. for type 1D7–G. The higher filament current may introduce difficulties in a series filament arrangement but is of no consequence (apart from A battery drain) in a 2 volt receiver.

Type 1C7–G will, in general, give slightly better performance on the broadcast band than will type 1D7–G. On the shortwave band, however, type 1C7–G is very much superior.

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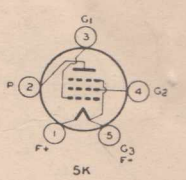
TYPE: 1F4.

Replace by Australian-made

RADIOTRON 1D4.

Same base connections (medium 5 pin base):

Pin 1. Filament +
Pin 2. Plate
Pin 3. Grid
Pin 4. Screen
Pin 5. Filament–.



5K

These two types are normally directly interchangeable without any change whatever to the wiring or applied voltages. Type 1D4 is considerably more economical in B battery drain, but draws a heavier filament current. The filament current for type 1D4 is 0.24 amp. as compared to 0.12 amp. for type 1F4. This difference is not likely to be important in ordinary 2.0 volt receivers.

In 6 volt series-parallel filament circuits some alterations may be necessary to the filament arrangement to permit the use of type 1D4.

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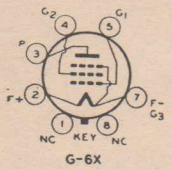
TYPE: 1F5-G.

Replace by Australian-made

RADIOTRON 1L5-G.

Same base connections (octal 7 pin base):



G-6X

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Grid
Pin 7. Filament –
Pin 8. No connection.

These two types are normally directly interchangeable without any change whatever to the wiring or applied voltages.

Type 1L5–G is considerably more economical in B battery drain, but draws a heavier filament current. The filament current for type 1L5–G is 0.24 amp. as compared to 0.12 amp. for type 1F5–G. The difference is not likely to be important in ordinary 2.0 volt receivers.

In 6 volt series-parallel filament circuits some alterations may be necessary to the filament arrangement to permit the use of type 1L5–G.

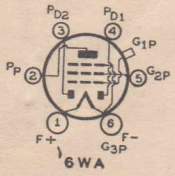
★ ★ ★ ★

TYPE: 1F6.

Replace by Australian-made

RADIOTRON 1K6.

Different base connections, but same base (small 6 pin). Diagram shows socket connections for type 1K6:



6WA

1K6.		1F6.
Filament +	Pin 1.	Filament +
Plate	Pin 2.	Plate
Diode No. 2	Pin 3.	Screen
Diode No. 1	Pin 4.	Diode No. 2
Screen	Pin 5.	Diode No. 1
Filament –	Pin 6.	Filament –
Grid	Cap.	Grid.

Minor differences exist between the characteristics of these types.

Type 1K6 draws a heavier filament current (0.12 amp.) than type 1F6 (0.06 amp.).

The diodes of type 1K6 are situated one at each end of the filament, whereas in type 1F6 they are both at the negative end of the filament. No harm will be done, however, if the two diodes in the 1K6 are connected together.

In most cases, as resistance coupled amplifiers, no readjustment of screen voltage is required, but this may be done, if desired, simply by changing the screen dropping resistor. The correct conditions for type 1K6 are:—Plate load .25 megohm, screen dropping resistor 1.0 megohm, bias –1.5 volts.

As R.F. or reflex amplifiers the two types are similar, except that A.V.C. may not be applied to the 1K6.

★ ★ ★ ★

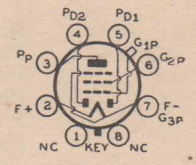
TYPES: 1F7G, 1F7-GH, 1F7-GV.

Replace by Australian-made

RADIOTRON 1K7-G.

Same base connections (octal 8 pin base). Diagram shows base connections for 1K7–G:

Pin 1. No connection
Pin 2. Filament +
Pin 3. Pentode plate
Pin 4. Diode No. 2
Pin 5. Diode No. 1
Pin 6. Pentode screen
Pin 7. Filament –
Pin 8. No connection
Cap. Pentode grid.



G-7AE

Type 1F7-GH has the same diode arrangement as type 1K7–G, but type 1F7-GV has both diodes at the negative end of the filament. No harm will be done, however, if the two diodes in the 1K7–G are connected together.

In most cases, as resistance coupled amplifiers, no readjustment of screen voltage is required but this may be done, if desired, simply by changing the screen dropping resistor. The correct conditions for type 1K7–G are:—Plate load .25 megohm, screen dropping resistor 1.0 megohm, bias –1.5 volts.

As R.F. or reflex amplifiers the two types are similar except that A.V.C. may not be applied to the 1K7–G.

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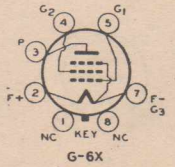
TYPE: 1G5-G.

Replace by Australian-made

RADIOTRON 1L5-G.

Same base connections (octal 7 pin base):

Pin 1. No connection
Pin 2. Filament +
Pin 3. Plate
Pin 4. Screen
Pin 5. Grid
Pin 7 Filament –
Pin 8. No connection.



G-6X

Although the base connections are identical there are marked differences in the characteristics as shown in the table below:—

	1G5–G	1L5–G	
Filament current	0.12	0.24	amp.
Plate voltage	135	135	volts
Screen voltage	135	135	volts
Grid bias	–13.5	–4.5	volts
Plate current (zero sig.)	8.7	6.0	mA.
Screen current (zero sig.)	2.5	1.5	mA.
Load resistance	9000	15000	ohms.
Power output	550	340	mW.

In most cases the only changes necessary to substitute type 1L5–G are to reduce the bias to –4.5 volts and to change the loudspeaker transformer to one rated at a load of 15000 ohms.

If higher power (550 mW.) is desirable, this may be obtained with the 1L5–G by increasing the plate and screen voltages to 157.5 volts, maintaining the grid bias at –4.5 volts and the load at 15000 ohms.

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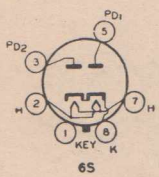
TYPE: 1V.

Replace by Australian-made

RADIOTRON 6X5-GT.

Different base connections. Diagram shows base connections for type 6X5-GT:



6S

6X5–GT	1V.
Octal 6 pin base.	Small 4 pin base.
Pin 1. No connection	Pin 1. Heater
Pin 2. Heater	Pin 2. Plate
Pin 3. Plate No. 2	Pin 3. Cathode
Pin 5. Plate No. 1	Pin 4. Heater
Pin 7. Heater	
Pin 8. Cathode.	

Type 1V is a half-wave indirectly heated rectifier having a heater current of 0.3 ampere, while type 6X5–GT is a full-wave indirectly heated rectifier, having a heater current of 0.6 ampere at 6.3 volts. The 6X5–GT may be used as a replacement for type 1V where the heater is supplied from a 6.3 volt source but not in AC/DC receivers.

To replace one type 1V by one type 6X5–GT it is advisable to connect together both plates of the 6X5–GT and under these conditions the maximum permissible d-c output current will be greater than that of the 1V. The impedance of the 6X5–GT under these conditions will be less than that of the 1V, with the result that the output voltage will be slightly higher.

Type 6X5–GT is somewhat smaller both in height and diameter than type 1V.

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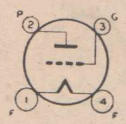
TYPE: 2A3.

Replace by two Australian-made

RADIOTRON TYPE 45.

Same base connections (medium 4 pin base):



4D

Pin 1.	Filament	Pin 3.	Grid
Pin 2.	Plate	Pin 4.	Filament.

In general it is satisfactory to connect two type 45 in parallel as a replacement for each type 2A3 and no change need be made to the load resistance. If cathode bias is used there is no necessity to change the cathode bias resistor, but if fixed bias is used it is necessary to increase the bias voltage until the plate current is equal to the plate current of one type 2A3. Under normal operating conditions the plate current drawn by two type 45 valves is greater than that drawn by one type 2A3 and if this is more than the power supply is able to stand it is quite permissible to increase the bias so as to reduce the plate current to the desired figure.

In many cases it will be found that a pair of push-pull type 2A3 valves may be replaced satisfactorily with a pair of push-pull type 45 valves. A power output of 5.5 watts is obtainable with two type 45 valves in class A_1 with a plate voltage of 275 volts, a grid voltage of –56 volts and a load resistance of 3900 ohms from plate to plate.

Radiotron type 45 valves are very conservatively rated and still higher figures of power output may be obtained by operating the valves under conditions somewhat in excess of the ratings.

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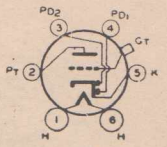
TYPES: 2A6, 2A6S.

Replace by Australian-made

RADIOTRON 75.

Same base connections (small 6 pin base):

Pin 1.	Heater	Pin 4.	Diode No. 1
Pin 2.	Triode plate	Pin 5.	Cathode
Pin 3.	Diode No. 2	Pin 6.	Heater
Cap.	Triode grid.		



6G

The only difference between type 2A6 and type 75 is in the heater rating. In the case of type 2A6 the heater rating is 0.8 ampere at 2.5 volts, while for type 75 the heater rating is 0.3 ampere at 6.3 volts. If no provision is made in the existing power transformer for the supply of 6.3 volts to the heaters it will be necessary to add a small filament transformer stepping down from 240 to 6.3 volts or stepping up from 2.5 to 6.3 volts. These transformers are available from transformer manufacturers at a cost of a few shillings.

If such a transformer is added to a receiver it will be possible to change over the valves one by one, so as to use 6.3 volt valves when the existing 2.5 volt valves are discarded.

Type 2A6S is identical to type 2A6, except that it has a metal sprayed bulb.

In some cases type 2A6 may be replaced directly by type 55 (imported type available from stock) with some loss of gain.

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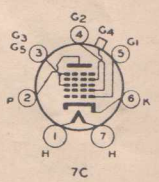
TYPES: 2A7, 2A7S.

Replace by Australian-made

RADIOTRON 6A7.

Same base connection (small 7 pin base):

Pin 1.	Heater	Pin 5.	Oscillator grid
Pin 2.	Plate		
Pin 3.	Screen	Pin 6.	Cathode
Pin 4.	Anode grid	Pin 7.	Heater
Cap.	Signal grid		



7C

Type 2A7 is electrically identical to type 6A7, except for the heater rating. Type 2A7 has a heater rated at 0.8 ampere at 2.5 volts, while type 6A7 is rated at 0.3 ampere at 6.3 volts.

To replace type 2A7 by type 6A7 it is necessary to provide a 6.3 volt heater supply. If no provision has been made for this on the power transformer it will be necessary to add a small filament transformer stepping down from 240 volts to 6.3 volts, or stepping up from 2.5 to 6.3 volts. Filament transformers are available from transformer manufacturers at the cost of a few shillings.

Type 2A7S is identical to type 2A7, except that it has a metal sprayed bulb. Type 6A7 may, therefore, require a shield can for stability when replacing type 2A7S.

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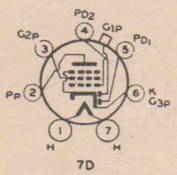
TYPES: 2B7, 2B7S.

Replace by Australian-made

RADIOTRON 6B7.

Same base connections (small 7 pin base):



Pin 1.	Heater
Pin 2.	Plate
Pin 3.	Screen
Pin 4.	Diode No. 2
Pin 5.	Diode No. 1
Pin 6.	Cathode
Pin 7.	Heater
Cap.	Grid.

The only difference between type 2B7 and type 6B7 is in the heater rating. Type 2B7 has a heater rated at 0.8 ampere at 2.5 volts, while type 6B7 is rated at 0.3 ampere at 6.3 volts. If no provision is made on the existing power transformer for the supply of 6.3 volts to the heaters it will be necessary to add a small filament transformer stepping down from 240 to 6.3 volts. or stepping up from 2.5 to 6.3 volts. These transformers are available from transformer manufacturers at a cost of a few shillings.

If such a transformer is added to a receiver it will be possible to change over the valve sockets, one by one, so as to use 6.3 volt valves when the existing 2.5 volt valves are discarded.

Type 2B7S is identical to type 2B7 except that it has a metal sprayed bulb. Type 6B7 may, therefore, require a shield can for stability when replacing type 2B7S.

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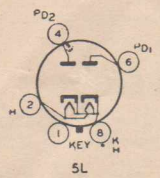
TYPE: 5U4-G.

Replace by Australian-made

RADIOTRON 5V4-G.

Same base connections (octal 5 pin base):



Pin 1.	No connection
Pin 2.	Filament *
Pin 4.	Plate No. 2
Pin 6.	Plate No. 1
Pin 8.	Filament *

*In the case of type 5V4–G the heater is connected to pins 2 and 8, and the cathode is connected to pin 8.

Type 5U4–G is a directly heated full-wave rectifier, while type 5V4–G is an indirectly heated full-wave rectifier. The heater current of type 5V4–G is 2 amperes, while that for type 5U4–G is 3 amperes, both operating at 5 volts. Care should be taken to avoid exceeding the maximum ratings for type 5V4–G when it is used as a replacement for type 5U4–G. It is recommended that in all cases a resistance of 125 ohms (rated at 3 watts) be inserted in series with each plate of the 5V4–G so that the effective impedance and output voltage will be approximately the same as for type 5U4–G. These resistors will also improve the reliability of the 5V4–G and reduce danger of break-down through surges. With these additional resistors and a condenser input filter the 5V4–G may be used with the same maximum a-c plate voltage per plate (450 volts RMS) as type 5U4–G. The maximum d-c output current is, however, limited to 175 mA with an input capacitance of 8 μF or 200mA with 4 μF.

With a choke input filter these additional resistors are unnecessary, but the maximum a-c plate voltage per plate should not exceed 500 volts RMS. The d-c output current should not exceed 175 mA for type 5V4–G.

Type 5U4–G may also be replaced by the English-made type U52/5U4–G, or by two parallel-connected type 5Y3–G.

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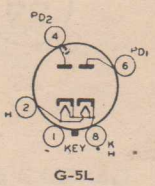
TYPE: 5X4-G.

Replace by Australian-made

RADIOTRON 5V4-G.

Different base connections. The diagram shows the base connections for type 5V4–G.

5X4–G. Octal 8 pin base.	5V4–G. Octal 5 pin base.
Pin 1. No connection	Pin 1. No connection
Pin 2. No connection	Pin 2. Heater
Pin 3. Plate No. 2	Pin 4. Plate No. 2
Pin 4. No connection	Pin 6. Plate No. 1
Pin 5. Plate No. 1	Pin 8. Heater and cathode
Pin 6. No connection	
Pin 7. Filament	
Pin 8. Filament	



Type 5X4–G is electrically identical to type 5U4–G, but has a different number of pins in the base and different base connections. Apart from these differences in the base all other remarks apply as for type 5U4–G.

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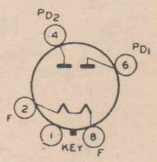
TYPE: 5Y4-G.

Replace by Australian-made

RADIOTRON 5Y3-G.

Different base connections. The diagram shows the base connections for type 5Y3–G:

5Y4–G. Octal 8 pin base.	5Y3–G. Octal 5 pin base.
Pin 1. No connection	Pin 1. No connection
Pin 2. No connection	Pin 2. Filament
Pin 3. Plate No. 2	Pin 4. Plate No. 2
Pin 4. No connection	Pin 6. Plate No. 1
Pin 5. Plate No. 1	Pin 8. Filament.
Pin 6. No connection	
Pin 7. Filament	
Pin 8. Filament	



Types 5Y4–G and 5Y3–G are electrically identical, the only difference being in the base.

Type 5Y4–G has 8 pins in the base. while type 5Y3–G has only 5 pins, but the connections to the pins are different for the two types.

To replace type 5Y4–G by type 5Y3–G it is only necessary to change the connections to the socket.

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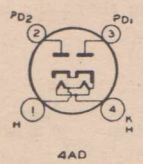
TYPE: 5Z3.

Replace by Australian-made

RADIOTRON 83V.

Same base connections (medium 4 pin):



Pin 1. Filament *
Pin 2. Plate
Pin 3. Plate
Pin 4. Filament *

*In the case of type 83V the heater is connected to pins 1 and 4 and the cathode is connected to pin 4.

Type 5Z3 is a directly heated full-wave rectifier, while type 83V is an indirectly heated full-wave rectifier. The heater current of type 83V is 2 amperes, while that for type 5Z3 is 3 amperes, both operating at 5 volts. Care should be taken to avoid exceeding the maximum ratings for type 83V when it is used as a replacement for type 5Z3. It is recommended that in all cases a resistance of 125 ohms (rated at 3 watts) be inserted in series with each plate of the 83V so that the effective impedance and output voltage will be approximately the same as for type 5Z3. These resistors will also improve the reliability of the 83V and reduce danger of break-down through surges. With these additional resistors and a condenser input filter the 83V may be used with the same maximum a-c plate voltage per plate (450 volts RMS) as type 5Z3. The maximum d-c output current is, however, limited to 175 mA with an input capacitance of 8μF or 200 mA with 4μF.

With a choke input filter these additional resistors are unnecessary, but the maximum a-c plate voltage per plate should not exceed 500 volts RMS. The d-c output current should not exceed 175 mA for type 83V.

Type 5Z3 may also be replaced by the English-made type U52/5U4-G or by two parallel connected type 80.

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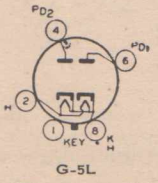
TYPES: 5Z4, 5Z4-G, 5Z4-MG.

Replace by Australian-made

RADIOTRON 5V4-G.

Same base connections (octal 5 pin base):



Pin 1. Shell *
Pin 2. Heater
Pin 4. Plate No. 2
Pin 6. Plate No. 1
Pin 8. Heater and cathode

*No connection in the case of type 5Z4-G or 5V4-G.

Types 5Z4 and 5Z4-G may be directly replaced by type 5V4-G, but type 5V4-G has a slightly lower impedance, with the result that the output voltage is slightly higher. In most cases this difference may be neglected. Type 5V4-G has a considerably higher maximum output current and should, therefore, give very satisfactory service when used as a replacement for type 5Z4-G, which would be operating more closely to its maximum current rating.

Type 5V4-G has approximately the same overall dimensions as type 5Z4-G, but is larger than type 5Z4. Type 5Z4-MG is a metal-glass version of type 5Z4 and has similar characteristics. It is slightly longer than type 5V4-G but is of smaller diameter.

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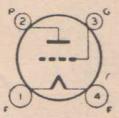
TYPE: 6A3.

Replace by Australian-made

RADIOTRON 45's.

Same base connections (medium 4 pin base):

Pin 1. Filament
Pin 2. Plate
Pin 3. Grid
Pin 4. Filament.



Type 6A3 has a 6.3 volt 1.0 ampere filament, while each type 45 has a 2.5 volt 1.5 ampere filament.

If a suitable source of a-c voltage is obtainable the 45 valves may be connected with the filaments in parallel and the total drain will then be 3 amperes at 2.5 volts. As an alternative the two filaments of the 45 valves may be connected in series, thus drawing 1.5 amperes at 5 volts. The remaining 1.3 volts may be dropped by means of a resistor having a resistance of 0.9 ohm. The connection between the two filaments may then be used as the negative return.

The electrical characteristics of two type 45 valves in parallel are very similar to those of one type 6A3. For Class A operation the grid bias for the 45 valves is –50 volts, and for Class AB_1 operation with a plate voltage of 300 volts the bias should be –70 volts. The load resistance may be left unchanged and the power output would be approximately the same.

In many cases sufficient power output will be available from two type 45 valves in push-pull to take the place of two type 6A3 valves in push-pull. A power output of 7.5 watts is obtainable from two type 45 valves with class AB_1 operation, at a plate voltage of 300 volts and –70 volts bias, or 5.5 watts with a plate voltage of 275 volts and a grid bias of –56 volts.

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TYPE: 6AB6-G.

Replace by Australian-made

RADIOTRON 6F6-G.

Same base connections (octal 7 pin base). The diagram shows the base connections for type 6F6-G:

Pin 1. No connection
Pin 2. Heater
Pin 3. Plate
Pin 4. Screen*
Pin 5. Grid
Pin 7. Heater
Pin 8. Cathode.

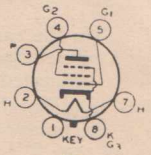

*Plate of first unit in case of 6AB6-G.

Type 6AB6-G is a direct coupled power triode incorporating a driver valve and an output valve in the same envelope. The driver valve is internally coupled to the grid of the output valve so that the operation is almost identical to that of a single valve. Owing, however, to the special construction no external provision is required for grid bias and the valve may, therefore, be treated as requiring zero bias. It may be replaced directly by one type 6F6-G provided that the correct bias resistor and bypass condenser are added. For single valve 250 volt operation a cathode resistor of 400 to 450 ohms is required. With this modification type 6F6-G may be used as a replacement and the power output and sensitivity will remain practically unchanged.

Two type 6AB6-G valves in push-pull may also be replaced by two type 6F6-G valves in push-pull under the same conditions of plate voltage, but with the necessary provision for grid bias. For 250 volt operation the bias resistor for two type 6F6-G valves is 205 ohms.

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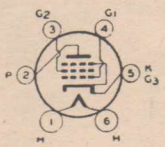
TYPE: 6B5.

Replace by Australian-made

RADIOTRON 42.

Same base connections (medium 6 pin base). The diagram shows the base connection for type 42:



Pin 1. Heater
Pin 2. Plate
Pin 3. Screen*
Pin 4. Grid
Pin 5. Cathode
Pin 6. Heater.

*Plate of first unit in case of 6B5.

Type 42 may be used as a direct replacement for type 6B5 provided that a cathode bias resistor and bypass condenser are added.

See remarks as for type 6AB6–G. Types 6AB6–G and 6B5 are identical electrically.

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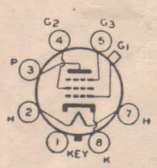
TYPES: 6C5, 6C5-G, 6C5-GT, 6C5-MG.

Replace by Australian-made

RADIOTRON 6J7-G.

Different base connections. The diagram shows the base connection for type 6J7–G:



6J7–G. Octal 7 pin base.		6C5, etc. Octal 6 pin base.	
Pin 1.	Internal shield	Pin 1.	Shell*
Pin 2.	Heater	Pin 2.	Heater
Pin 3.	Plate	Pin 3.	Plate
Pin 4.	Screen	Pin 5.	Grid
Pin 5.	Suppressor	Pin 7.	Heater
Pin 7.	Heater	Pin 8.	Cathode
Pin 8.	Cathode		
Cap.	Grid.		

*No connection for types 6C5–G or 6C5–GT.

Type 6J7–G is a pentode which may be connected as a triode and under these conditions is electrically identical to type 6C5.

To replace type 6C5 by type 6J7–G it is necessary to modify the socket connections, joining together pins 3, 4 and 5 on the 6J7–G, so as to form the triode plate. The grid connection should then be taken to the top cap. In some cases it may be found necessary to use shielded wire for the top cap connection.

If type 6J7–G is used to replace the metal type 6C5 or the metal-glass type 6C5–MG it may be necessary to provide a valve shield.

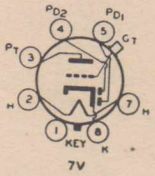
★ ★ ★ ★

TYPES: 6F5, 6F5-G, 6F5-GT, 6F5-MG.

Replace by Australian-made

RADIORON 6B6-G.

Different base connections. The diagram shows the base connections for type 6B6–G:



6F5, etc. Octal 5 pin base.		6B6–G. Octal 7 pin base.	
Pin 1.	Shell*	Pin 1.	No connection
Pin 2.	Heater	Pin 2.	Heater
Pin 4.	Plate	Pin 3.	Triode plate
Pin 7.	Heater	Pin 4.	Diode No. 2
Pin 8.	Cathode	Pin 5.	Diode No. 1
Cap.	Grid.	Pin 7.	Heater
		Pin 8.	Cathode
		Cap.	Grid.

*No connection in the case of types 6F5–G or 6F5–GT.

Type 6F5 is a high-mu triode, while type 6B6–G is a high-mu triode which also incorporates two diode units. When type 6B6–G is used to replace type 6F5 these diode units may not be required and should then be connected directly to the cathode. The electrical characteristics of the triode unit of type 6B6–G are practically identical to those of type 6F5 and no change need be made to the circuit in consequence. When type 6B6–G is used to replace the metal type 6F5 or the metal-glass type 6F5–MG it may be necessary to fit a valve shield.

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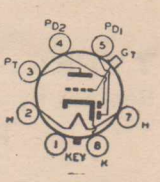
TYPES: 6H6, 6H6-G, 6H6-GT, 6H6-MG.

Replace by Australian-made

RADIOTRON 6B6-G.

Different base connections. The diagram shows the base connections for type 6B6–G:



6H6, etc. Octal 7 pin base.		6B6–G. Octal 7 pin base.	
Pin 1.	Shell*	Pin 1.	No connection
Pin 2.	Heater	Pin 2.	Heater
Pin 3.	Plate No. 2	Pin 3.	Triode plate
Pin 4.	Cathode No. 2	Pin 4.	Diode No. 2
Pin 5.	Plate No. 1	Pin 5.	Diode No. 1
Pin 7.	Heater	Pin 7.	Heater
Pin 8.	Cathode No. 1	Pin 8.	Cathode
		Cap.	Grid.

*Internal shield in the case of types 6H6–G or 6H6–GT.

Type 6H6 is a twin diode having two separate cathodes. When used in circuits requiring two separate cathodes there is no Australian equivalent and it might be necessary to employ two separate valves each as a single diode. In many circuits, however, the two cathodes are connected together and in most of these cases type 6B6–G may be used as a replacement. Type 6B6–G incorporates a triode unit in addition to the diodes, but this may be left disconnected or the grid and plate may be connected to the cathode if not required. In some circuits it may be possible to use one type 6B6–G to replace both the 6B6 detector and the following a-f amplifier valve. If a pentode amplifier is required type 6B8–G may be used in place of 6B6–G, the diodes of both types being identical.

The diodes of type 6B6–G may only be used in conjunction with high impedance diode loads and when load resistances of less than .1 megohm are used it is not advisable to use these small diodes. In such a case, the grid of the triode section of the 6B6–G may be used as a diode plate and the plate of the 6B6–G triode section connected to the cathode. If a second diode unit is not required it would be possible to connect both diode plates in parallel and these would then be capable of operating with a diode load resistance as low as 50,000 ohms.

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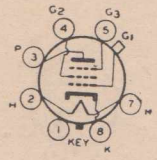
TYPES: 6J5, 6J5-G, 6J5-GT, 6J5-GTX.

Replace by Australian-made

RADIOTRON 6J7-G.

Different base connections. The diagram shows the base connections for type 6J7-G:



G-7R

	6J7–G. (Octal 7 pin base)	6J5 etc. (Octal 6 pin base)
Pin 1.	Internal shield	Shell*
Pin 2.	Heater	Heater
Pin 3.	Plate	Plate
Pin 4.	Screen	
Pin 5.	Suppressor	Grid
Pin 7.	Heater	Heater
Pin 8.	Cathode	Cathode
Cap.	Grid.	

*No connection in case of types 6J5–G, 6J5–GT or 6J5–GTX.

Type 6J5 is a general purpose triode valve, whereas type 6J7–G is a pentode which may be connected as a triode. To replace type 6J5 by type 6J7–G it is necessary to connect together pins 3, 4 and 5 in the base, these forming the plate under triode conditions. The grid connection should then be taken to the top cap. It may be found under certain conditions that a shielded grid lead is necessary.

There are minor differences between the characteristics of type 6J5 and type 6J7–G connected as a triode. The same grid bias is used, but type 6J5 draws a heavier plate current and has a lower plate resistance. The amplification factors of the two types are identical.

In most transformer coupled circuits no change is required in any of the circuit constants. In most resistance coupled circuits the two types may be interchanged without any change in circuit constants. As an oscillator type 6J7–G is not so satisfactory as type 6J5 and it is suggested that under these conditions type 6U7–G may be used as a replacement for type 6J5.

Type 6U7–G has the same base connections as type 6J7–G but draws a heavier plate current and has a higher trans-conductance. Type 6J7–GTX is similar to type 6J7–GT except that it has a low loss base.

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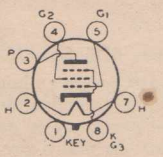
TYPES: 6K6-G, 6K6-GT, 6K6-MG

Replace by Australian-made

RADIOTRON 6F6-G.

Same base connections (octal 7 pin base):



G-7S

Pin 1.	No connection
Pin 2.	Heater
Pin 3.	Plate
Pin 4.	Screen
Pin 5.	Grid
Pin 7.	Heater
Pin 8.	Cathode.

Type 6K6–G is a power pentode having a heater current of .4 ampere at 6.3 volts. Type 6F6–G has a heater current of .7 ampere at 6.3 volts. If the transformer is capable of supplying the additional .3 ampere of heater current the two types may, in most cases, be directly interchanged. The optimum bias for type 6F6–G is –16.5 volts as compared with –18 volts for type 6K6–G, but the difference is so small as to be negligible in most cases. The same load resistance is suitable for both types and the output powers are practically identical.

In cases where the transformer is not capable of supplying the additional heater current it is suggested that type 6V6–G might be used. The heater current for this type is .45 ampere, which is almost the same as that for type 6K6–G. To substitute type 6V6–G in place of type 6K6–G the cathode resistor should be changed to 250 ohms for a single valve and the load resistance should be changed to 5,000 ohms if the best results from this type are required. In many cases it may be found possible to operate with the increased bias and a higher load resistance since the power output of the 6V6–G is considerably greater than that of the 6K6–G.

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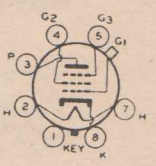
TYPES: 6K7, 6K7-G, 6K7-GTX 6K7-M, 6K7-MG.

Replace by Australian-made

RADIOTRON 6K7-GT OR 6U7-G.

Same base connections (octal 7 pin base):

Pin 1.	Shell*
Pin 2.	Heater
Pin 3.	Plate
Pin 4.	Screen
Pin 5.	Suppressor
Pin 7.	Heater
Pin 8.	Cathode**
Cap.	Grid.



G-7R

*No connection in the case of types 6K7–G, 6K7–GT, 6K7–GTX or 6U7–G.

**The internal shield is returned to the cathode pin in all types except 6K7–GT, in which it is connected to the suppressor (pin 5). Type 6U7–G has only a dome shield.

All these types may in general be directly interchanged without any adjustment, beyong re-trimming. They differ, however, in external dimensions and construction. Type 6K7–G has approximately the same overall dimensions as type 6U7–G, but the latter requires a special shield can suitable for a dome-top bulb.

Type 6K7–GT when used as a replacement for type 6K7 may require an external shield can. Type 6K7–GTX is similar to type 6K7–GT except that it is fitted with a low-loss base. Type 6K7–M has a sprayed envelope and when replaced by type 6K7–GT the latter may require a shield can. Type 6K7–MG is of metal-glass construction and the same remarks apply as for type 6K7–M.

★ ★ ★ ★

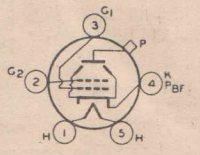
TYPES: 6L6, 6L6-G, 6L6-GX.

Replace by Australian-made

RADIOTRON 807.

Different base connections. The diagram shows the base connections for type 807:

	6L6, etc. (Octal 7 pin base).	807. (Medium 5 pin base).
Pin 1.	Shell*	Heater
Pin 2.	Heater	Screen
Pin 3.	Plate	Grid
Pin 4.	Screen	Cathode
Pin 5.	Grid	Heater
Pin 7.	Heater	
Pin 8.	Cathode	Cap. Plate.



*No connection in case of types 6L6–G or 6L6–GX.

Type 807 is primarily a transmitting valve, but has electrical characteristics identical with those of type 6L6. It may, therefore, be used as a replacement for type 6L6 without any change whatever in the circuit constants, although it is necessary to change the socket from the octal to a 5-pin socket and to take an insulated lead to the top cap which is connected to the plate. The plate lead may be constructed by using a short length of "cab-tyre" insulated cable with an insulated cover to protect the top cap from accidental contact by hand. Type 807 is capable of being used at voltages up to 600 volts under continuous operating conditions or 750 volts under intermittent conditions, and is, therefore, capable of delivering an even higher power output provided that the amplifier and power supply are designed for it. In most cases it will merely be necessary to replace type 6L6 by type 807, without any change whatever in the circuit. Longer life would normally be expected since type 807 has a larger reserve of insulation and is not subject to arcing-over.

Type 6L6–GX is similar to type 6L6–G but is fitted with a low-loss base.

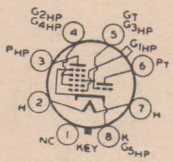
★ ★ ★ ★

TYPES: 6L7, 6L7-G, 6L7-MG.

Replace by Australian-made

RADIOTRON 6J8-G.

Different base connections. †The diagram shows the base connections for type 6J8–G:



G-8H

	6J8–G (Octal 8 pin base).	6L7, etc. (Octal 7 pin base).
Pin 1.	No connection.	Shell*
Pin 2.	Heater.	Heater
Pin 3.	Heptode plate.	Plate
Pin 4.	Heptode screen.	Screen
Pin 5.	Triode grid and heptode (oscillator) injector grid.	Oscillator injector grid
Pin 6.	Triode plate.	Heater
Pin 7.	Heater.	Cathode and suppressor
Pin 8.	Cathode and suppressor.	
Cap.	Heptode signal grid.	Signal grid

*No connection in the case of type 6L7–G.

†Although type 6J8–G incorporates a triode oscillator in addition to the pentagrid mixer the arrangement of pins is such that type 6J8–G may be substituted directly for type 6L7, provided that no connection is made to pin 6 in the socket. To this extent the basing is similar.

Type 6L7 is a pentagrid mixer normally intended for use with a separate oscillator. Type 6J8–G has two units in one envelope, these being a heptode (otherwise known as a pentagrid) and a triode, which is normally used as an oscillator. If the triode plate is left disconnected the 6J8–G is a fairly close equivalent to the 6L7, although the conversion transconductance is somewhat lower and the electrode currents are somewhat different. The 6J8–G also has a considerably higher plate resistance.

In some cases type 6J8–G may be used as a replacement for both type 6L7 and the oscillator valve, so that one valve will take the place of two. This is not necessarily true and depends upon the coil design in the particular circuit.

In other special applications type 6J8–G may sometimes be used as a replacement for type 6L7, but it will be necessary to carry out experimental tests beforehand.

Type 6L7–MG is a metal-glass valve which incorporates internal screening so that when replaced by type 6J8–G the latter will normally require an external screen.

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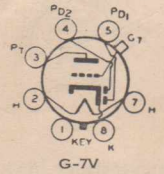
TYPES: 6Q7, 6Q7-G, 6Q7-GT, 6Q7-MG.

Replace by Australian-made

RADIOTRON 6B6-G.

Same base connections (octal 7 pin base):



G-7V

Pin 1.	Shell*	Pin 5.	Diode No. 1
Pin 2.	Heater	Pin 7.	Heater
Pin 3.	Triode plate	Pin 8.	Cathode
Pin 4.	Diode No. 2	Cap.	Grid.

*No connection for types 6Q7–G, 6Q7–GT and 6B6–G.

Types 6Q7 and 6B6–G are electrically very similar although there are minor differences in electrical characteristics which may usually be neglected. In most cases type 6B6–G may be used as a direct replacement for type 6Q7–G and also for type 6Q7, although in the latter case a valve shield may also be required. Type 6B6–G may also be used as a replacement for type 6Q7–GT, except that the envelope is larger. Type 6B6–G may be used as a replacement for type 6Q7–MG provided that a valve shield is added and provided that the different envelope dimensions are no detriment.

Type 6Q7 has a longer grid base than type 6B6–G and this fact is useful when the valve is used with a plate voltage supply of only 100 volts. Under these conditions the output voltage of type 6B6–G is limited. but at higher voltages the two types may be replaced with no change. Even with a supply voltage of 100 volts type 6B6–G is often a satisfactory replacement for type 6Q7.

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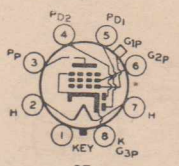
TYPES: 6R7, 6R7-G, 6R7-GT, 6R7-MG.

Replace by Australian-made

RADIOTRON 6B8-G.

Different base connections. The diagram shows the base connections for type 6B8–G:

	6R7, etc. (Octal 7 pin base).	6B8–G. (Octal 8 pin base).
Pin 1.	Shell*	No connection
Pin 2.	Heater	Heater
Pin 3.	Triode plate	Plate
Pin 4.	Diode No. 2	Diode No. 2
Pin 5.	Diode No. 1	Diode No. 1
Pin 7.	Heater	Screen
Pin 8.	Cathode	Heater
Cap.	Triode grid	Cathode
		Grid.



8E

*No connection for types 6R7–G or 6R7–GT.

Type 6R7 is a duo-diode general purpose triode, while type 6B8–G is a duo-diode pentode, which may also be connected with the amplifier section as a triode. The characteristics of the 6B8–G amplifier section as a triode in many cases are sufficiently similar for a replacement to be made without any adjustment to voltages or resistances. With resistance coupling it may generally be assumed that a direct replacement is possible, but with a transformer coupling it is desirable to increase the grid bias from –9 volts for the 6R7 to –20 volts for the 6B8–G triode. The amplification factor and stage gain of the 6B8–G triode are lower than those for type 6R7. Electrically the 6B8–G triode is identical to the triode unit of type 85.

★ ★ ★ ★

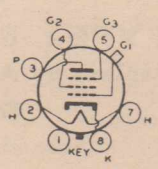
TYPES: 6S7, 6S7-G.

Replace by Australian-made

RADIOTRON 6K7-GT OR 6U7-G.

Same base connections (octal 7 pin base):

Pin 1.	Shell*
Pin 2.	Heater
Pin 3.	Plate
Pin 4.	Screen
Pin 5.	Suppressor
Pin 7.	Heater
Pin 8.	Cathode
Cap.	Grid.



7R

*No connection in the case of type 6S7–G, 6U7–G and 6K7–GT.

Type 6S7 is a super-control r-f pentode, having a 6.3 volt .15 ampere heater. Types 6K7–GT and 6U7–G are electrically very similar to types 6S7 except that their heaters are rated at 6.3 volts .3 ampere. The A battery or transformer would, therefore, need to supply the higher heater current.

Type 6S7 could be replaced by type 6K7–GT since the latter also has small overall dimensions. Type 6S7–G could be replaced by type 6U7–G which has approximately the same overall dimensions, although it could equally well be replaced by type 6K7–GT, having smaller dimensions.

The differences in electrical characteristics may, in almost all circumstances, be neglected.

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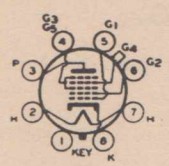
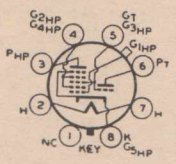
TYPES: 6SA7, 6SA7-GT.

Replace by Australian-made

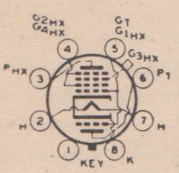
RADIOTRON 6A8-G, 6J8-G OR 6K8-G.



6A8-G



6J8-G



6 <8 G

Different base connections (octal 8 pin base):

	6A8–G, 6J8–G, 6K8–G.	6SA7.
Pin 1.	No connection	Shell* and suppressor
Pin 2.	Heater	Heater
Pin 3.	Plate	Plate
Pin 4.	Screen	Screen
Pin 5.	Oscillator grid	Oscillator grid
Pin 6.	Oscillator anode	Cathode
Pin 7.	Heater	Heater
Pin 8.	Cathode	Signal grid
Cap.	Signal grid.	

*Base shell in the case of type 6SA7–GT.

Type 6SA7 is a single ended pentagrid converter which has no oscillator plate, the screen serving the dual purpose of screen and oscillator plate. Special coils are required and these are frequently of the tapped single coil variety in place of the more usual primary and secondary oscillator coils used with other converter valves. To replace type 6SA7 by type 6A8–G it will be necessary to replace the oscillator coil with one suitable for use with type 6A8–G and to provide the usual 20,000 ohm dropping resistor for oscillator plate (anode grid) together with the usual bypass condenser.

Type 6J8–G may also be used as a replacement for type 6SA7 provided that suitable oscillator coils are used and that the oscillator plate is supplied from a 20,000 ohm dropping resistor with bypass condenser.

Type 6K8–G may also be used as a replacement for type 6SA7, provided that provision is made for supplying 100 volts to the triode plate. This may be done by the use of a 15.000 ohm dropping resistor common to both screen and triode plate. Oscillator coils suitable for type 6K8–G are also required.

The choice between the three replacement types will be governed by the type of receiver. Type 6A8–G is satisfactory for the broadcast band, while type 6J8–G has advantages on a short-wave band, particularly where low noise level is required. Type 6K8–G may be made to oscillate readily on the short-wave band. but has a somewhat higher noise level than type 6J8–G.

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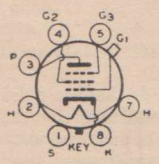
TYPE: 6W7-G.

Replace by Australian-made

RADIOTRON 6J7-G.

Same base connections (octal 7 pin base):



7R

Pin 1.	No connection*
Pin 2.	Heater
Pin 3.	Plate
Pin 4.	Screen
Pin 5.	Suppressor
Pin 7.	Heater
Pin 8.	Cathode
Cap.	Grid.

*Internal shield for 6J7–G.

Type 6W7–G has identical electrical characteristics to type 6J7–G and the two may, therefore, be interchanged without any alteration, provided that the battery or power supply can deliver the increased heater current of .3 ampere. It should be noted that pin 1 of the 6J7–G should be connected directly to earth.

★ ★ ★ ★

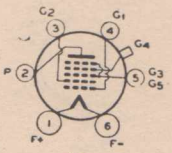
TYPE: 15.

Replace by Australian-made

RADIOTRON 1C6.

Different base connections. The diagram shows the base connections for type 1C6:

	15. (5 pin base).	1C6. (6 pin base).
Pin 1.	Heater	Filament +
Pin 2.	Plate	Plate
Pin 3.	Screen	Oscillator anode
Pin 4.	Cathode	Oscillator grid
Pin 5.	Heater	Screen
Cap.	Grid	Filament –
Pin 6.		Cap. Signal grid.



6L

Type 15 is an indirectly heated 2-volt pentode, which is most commonly used as an autodyne converter. The circuit is similar to that used in a-c autodyne receivers.

Type 1C6 is a pentagrid converter which can be used as a replacement for type 15 when the latter is used as a converter provided that changes are made in the circuit. Type 1C6 has a directly heated filament and draws considerably less filament current than type 15. The normal operating conditions for type 1C6 with a 135 volt B battery are:—grid, –3 volts; screen, 67.5 volts; oscillator plate (anode grid), 135 volts, through 20,000 ohms and suitably bypassed. The coils used for type 15 may, in some cases. also be used for type 1C6 but if not satisfactory they should be replaced by coils specially constructed for type 1C6.

If type 15 is used as an r-f pentode amplifier it may be replaced by type 1C4 operating with a screen voltage of 67.5 volts and grid zero. These conditions will give higher gain than will type 15 but if the higher gain is not required type 1C4 may be operated at a bias of –1.5 volts or alternatively at lower screen voltage. It should be noted that type 1C4 is directly heated.

★ ★ ★ ★

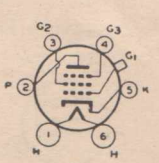
TYPES: 27, K27, 27-HM, 27-S.

Replace by Australian-made

RADIOTRON 57.

Different base connections. The diagram shows the base connections for type 57:

	27, etc. (5 pin base).	57. (6 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Grid	Screen
Pin 4.	Cathode	Suppressor
Pin 5.	Heater	Cathode
Pin 6.		Heater
Cap.		Grid.



6F

Type 27 is an indirectly heated general purpose triode having 2.5 volt 1.75 ampere heater. Type 57 is an indirectly heated 2.5 volt (1.0 amp.) r-f pentode which may also be connected as a triode. For triode operation pins 2, 3 and 4 should be tied together and used as the plate, while the grid connection should be taken to the top cap. Type 57 triode has a higher amplification factor and transconductance than type 27, but the plate resistances are very much the same. Type 57 triode should, therefore, be operated with a grid bias slightly less than half that for type 27 under the same operating conditions. With resistance coupling, however, it will probably be found satisfactory to leave the operating conditions unchanged.

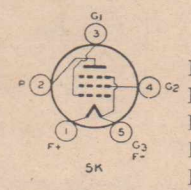
Type 27–S is a metal sprayed type which does not require an external shield can. If type 57 triode is used as a replacement it may possibly need an external shield can.

★ ★ ★ ★

TYPE: 31.

Replace by Australian-made RADIOTRON 1D4.

Different base connections. The diagram shows the base connections for type 1D4:



	1D4. (5 pin base).	31. (4 pin base).
Pin 1.	Filament +	Filament +
Pin 2.	Plate	Plate
Pin 3.	Grid	Grid
Pin 4.	Screen	Filament –
Pin 5.	Filament –	

Type 31 is a 2-volt power triode giving an output of 185 mW at 135 volts. Type 1D4 is a 2-volt power pentode giving an output of 350 mW with a 135 volt B battery. Although the power output obtainable from type 1D4 is almost double that obtainable from type 31 the B battery drain is slightly less, owing to its higher efficiency. The bias should be decreased from –22.5 to 4.5– and the screen (pin 4) should be connected to B+ maximum. The speaker transformer, for maximum power output, should be changed from 7,000 to 15,000 ohms, but in some cases it may be found possible to leave the existing transformer in place if it is found that the power output and tone are satisfactory.

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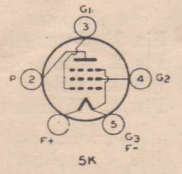
TYPE: 33.

Replace by Australian-made RADIOTRON 1D4.

Same base connections (5 pin base):



Pin 1. Filament +
Pin 2. Plate
Pin 3. Grid
Pin 4. Screen
Pin 5. Filament –

Type 1D4 may be used to replace type 33 with a reduction of maximum power output of approximately 50%. In many cases this may not be as serious as appears at first sight, since type 33 is generally employed with more than the optimum bias, in order to economise in B battery drain. To replace type 33 by type 1D4 it is necessary to decrease the bias to –4.5 volts and to change the speaker transformer to one rated at 15,000 ohms impedance. No harm will be done to the valve if the existing load impedance is retained, but the power output will be lower.

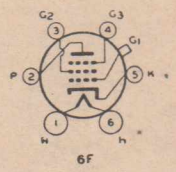
★ ★ ★ ★

TYPES: 36, 36A.

Replace by Australian-made RADIOTRON 6C6.

Different base connections. The diagram shows the base connections for type 6C6:

	36, 36A. (5 pin base).	6C6. (6 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Screen	Screen
Pin 4.	Cathode	Suppressor
Pin 5.	Heater	Cathode
Cap.	Grid	Heater
		Cap. Grid.



Type 36 is a screen grid r-f amplifier, while type 6C6 is a pentode r-f amplifier having higher gain and lower plate and screen currents. In most cases types 6C6 can be substituted for type 36 or for type 36A merely by making the necessary change in socket and connections.

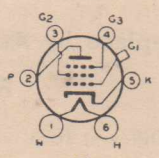
★ ★ ★ ★

TYPES: 37, 37A.

Replace by Australian-made RADIOTRON 6C6.

Different base connections. The diagram shows the base connections for type 6C6:

	37, 37A. (5 pin base).	6C6. (6 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Grid	Screen
Pin 4.	Cathode	Suppressor
Pin 5.	Heater	Cathode
		Heater
		Cap. Grid.



Type 37 is a general purpose triode while type 6C6 is an r-f pentode which may be connected as a triode to give characteristics somewhat similar to those of type 37. For triode operation Pins 2, 3 and 4 should be connected together to form the plate while the grid connection will go to the top cap.

In transformer coupled class A service a change in bias would be necessary when the change-over was made, from –18 volts for type 37 to –8 volts for type 6J7-G. If a cathode resistor is used it should be replaced by one having a resistance of 1,250 ohms for type 6C6 triode. In resistance coupled circuits a change in the value of the bias resistor may or may not be desirable.

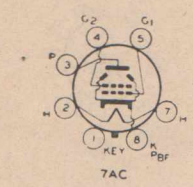
★ ★ ★ ★

TYPES: 38, 38A.

Replace by Australian-made

RADIOTRON 6V6-G.

Different base connections. The diagram shows the base connections for type 6V6-G:



7AC

	6V6–G. (Octal 7 pin base).	38, 38A. (5 pin base).
Pin 1.	No connection	Heater
Pin 2.	Heater	Plate
Pin 3.	Plate	Screen
Pin 4.	Screen	Cathode
Pin 5.	Grid	Heater
Pin 7.	Heater	
Pin 8.	Cathode.	
Cap.		Grid

Type 38 is a power pentode having comparatively low mutual conductance and giving a power output of 2.5 watts with 250 volts on plate and screen. Type 6V6–G is a beam power amplifier giving a power output of 4.5 watts under the same conditions. Type 6V6–G may, however, be operated with a lower screen voltage (about 150 volts) or with full screen voltage and over-bias (about –19 volts) so as to draw approximately the same plate current as type 38. In many cases the same load resistance may be used for both types.

Type 6V6–G has a higher heater current than type 38 (0.45 amp. compared to 0.3 amp.), and where this leads to difficulty the 38 may sometimes be replaced by type 6C6 or type 6B8–G with due respect to the maximum ratings of these types.

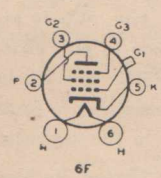
★ ★ ★ ★

TYPES: 39, 39/44, 39A.

Replace by Australian-made

RADIOTRON 6D6.

Different base connections. The diagram shows the base connections for type 6D6:



6F

	6D6. (6 pin base).	39, etc. (5 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Screen	Screen
Pin 4.	Suppressor	Cathode
Pin 5.	Cathode	Heater
Pin 6.	Heater	
Cap.	Grid.	Grid

Type 39 or 39/44 may be replaced, apart from the base and base connections, by type 6D6 without any change in the operating voltages. It will, however, require an adjustment of the trimmer condensers if used as an r-f amplifier, or re-alignment of the i-f transformers if used as an i-f amplifier.

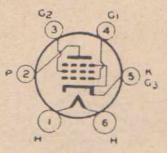
★ ★ ★ ★

TYPES: 41, 41M.

Replace by Australian-made

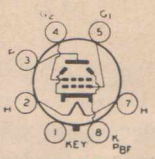
RADIOTRON 42 OR 6V6-G.

Same base connections in case of type 42. Different base connections in case of type 6V6–G:



6B

41, 42. (6 pin base).			
Pin 1.	Heater	Pin 4.	Grid
Pin 2.	Plate	Pin 5.	Cathode
Pin 3.	Screen	Pin 6.	Heater



G-7AC

6V6–G. (Octal 7 pin base).			
Pin 1.	No connection	Pin 5.	Grid
Pin 2.	Heater	Pin 7.	Heater
Pin 3.	Plate	Pin 8.	Cathode.
Pin 4.	Screen		

Types 41 and 42 are sufficiently similar electrically for one to be used as a direct replacement for the other. The heater current of the 42 is, however, .7 amp. as compared with .4 amp. for type 41.

If the higher heater current of type 42 is not permissible, as for example in a very small midget receiver, it is possible to use type 6V6–G as a replacement by changing the socket. It may be necessary to operate type 6V6–G with a bias higher than the normal value in order to reduce the plate current to the same value as for type 41. A bias of –15 volts or a cathode bias resistor of 400 ohms would be approximately correct. The load resistance need not be changed.

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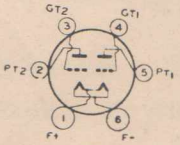
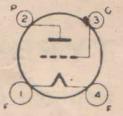
TYPE: 49.



6C

Replace by Australian-made

RADIOTRON 19 OR 30.



4D

Different base connections:

	19. (6 pin base).	49. (5 pin base).	30. (4 pin base).
Pin 1.	Filament +	Filament +	Filament +
Pin 2.	Plate (triode 2)	Plate	Plate
Pin 3.	Grid (triode 2)	Grid No. 1	Grid
Pin 4.	Grid (triode 1)	Grid No. 2	Filament –.
Pin 5.	Plate (triode 1)	Filament –	
Pin 6.	Filament –		

Type 49 is a dual grid valve so designed that grid No. 2 may be connected either to the plate (for use as a class A amplifier) or to grid No. 1 (for use as a class B amplifier). In most cases type 49 is used either as a driver for a class B stage, or else two type 49's are used in push-pull as a class B amplifier.

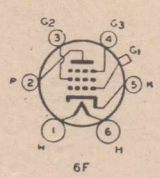
As a class A amplifier or driver, type 49 may be replaced by type 30 with a change of socket and a reduction in grid bias from –20 to –9 volts with 135 volts on the plate. The plate current and power output of type 30 under these conditions will be lower than for type 49 and this may cause some reduction in available power output.

As a class B amplifier each 49 valve may be replaced by one type 30, or alternatively the two type 49 valves may be replaced by one type 19. If two type 49's are replaced by one type 19 it will not be necessary to make any change in the operating voltages or conditions, but for economy it is desirable to operate type 19 with –4.5 volts grid bias. If each type 49 is replaced by one type 30 it will be necessary for these to be biassed sufficiently to reduce the plate current to approximately 1 mA. total. For a plate voltage of 135 volts the grid bias will need to be about –12.5 volts. The load resistance need not be changed.

TYPES: 56, 56A, 56AS, 56S.

Replace by Australian-made RADIOTRON 57 OR 6C6.

Different base connections. The diagram shows the base connections for types 57 or 6C6:



	57, 6C6. (6 pin base).	56, etc. (5 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Screen	Grid
Pin 4.	Suppressor	Cathode
Pin 5.	Cathode	Heater
Pin 6.	Heater	
Cap.	Grid.	

Type 56 is a general purpose triode while types 57 and 6C6 are r-f pentodes which may be used as triodes by connecting together pins 2, 3 and 4 as the plate. Types 57 or 6C6 connected as a triode require a lower bias than type 56 (–8 instead of –13.5 volts). In other respects their characteristics are very similar although the stage gain with types 57 or 6C6 will be higher.

Type 56 has a 2.5 volt heater and should therefore be replaced by type 57. Type 56S is similar to type 56 except that it has a sprayed metal envelope.

Type 56A has a 6.3 volt .4 amp. heater and should be replaced by type 6C6, the latter also having a 6.3 volt heater but drawing .3 amp. Type 56AS is similar to type 56A except that it has a sprayed bulb.

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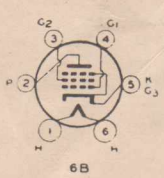
TYPES: 59, 59B.

Replace by Australian-made RADIOTRON 2A5.

Different base connections. The diagram shows the base connections for type 2A5:



	2A5. (6 pin base).	59, 59B. (Medium 7 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Screen	Grid No. 2
Pin 4.	Grid	Grid No. 1
Pin 5.	Cathode	Grid No. 3
Pin 6.	Heater.	Cathode*
Pin 7.		Heater

*No connection in the case of type 59B which is directly heated.

Type 59 is a triple grid power amplifier which may be connected either as a class A triode, class A pentode or class B triode. As a class A triode it is operated with grids Nos. 2 and 3 tied to the plate and grid No. 1 as the control grid. It may be replaced by type 2A5 with pins 2 and 3 tied together. The grid bias should be reduced from –28 volts for type 59 to –20 volts for type 2A5. The power output available from type 2A5 under these conditions will be slightly less than from type 59, but in other respects the characteristics are fairly similar.

Type 59 as a class A pentode is operated with grid No. 3 tied to the cathode, grid No. 2 as screen and grid No. 1 as control grid. It may be replaced by type 2A5 without any change in operating conditions, although the socket will need to be changed.

As a class B amplifier type 59 is operated with grid No. 3 tied to the plate while grids Nos. 2 and 1 are tied together to form the control grid. There is no direct replacement for type 59 under these conditions although it may be replaced with some reduction of power output by type 2A5 in class AB_2 with either triode or pentode connection.

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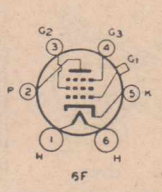
TYPE: 76.

Replace by Australian-made RADIOTRON 6C6.

Different base connections. The diagram shows the base connections for type 6C6:

	76. (5 pin base).	6C6. (6 pin base).
Pin 1.	Heater	Heater
Pin 2.	Plate	Plate
Pin 3.	Grid	Screen
Pin 4.	Cathode	Suppressor
Pin 5.	Heater	Cathode
Pin 6.		Heater
Cap.		Grid.



Type 76 is a general purpose triode while type 6C6 is an r-f pentode which may be connected as a triode (pins 2, 3 and 4 tied together to form the plate). Type 6C6 under transformer coupled conditions requires a decrease in bias from –13.5 volts to –8 volts, but in other respects the characteristics are fairly similar. Under resistance coupled conditions a change of bias resistor may or may not be necessary.

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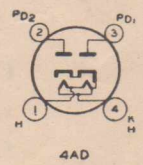
TYPE: 80S.

Replace by Australian-made RADIOTRON 80 OR 83V.

Same base connections (4 pin base).

Pin 1.	Filament or heater
Pin 2.	Plate No. 2
Pin 3.	Plate No. 1
Pin 4.	Filament or heater.



Type 80S is an indirectly heated medium impedance full-wave vacuum rectifier while type 80 is a directly heated, high-impedance full-wave vacuum rectifier. Type 80S may in many cases be replaced directly by type 80 with some reduction in output voltage, but care should be taken that damage is not done to the electrolytic condensers during the warming up period. Since type 80S has an indirectly heated cathode it affords a certain degree of protection to the filter condensers during the warming up period.

Type 83V is an indirectly heated full-wave vacuum rectifier which may be used directly as a replacement for type 80S, and will give slightly higher output voltage. Having an indirectly heated cathode it also will give protection to the filter condensers. Type 83V is capable of giving a considerably higher output current than type 80S.

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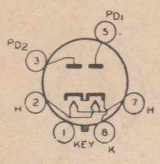
TYPES: 84, 84/6Z4.

Replace by Australian-made RADIOTRON 6X5-GT.

Different base connections The diagram shows the base connections for type 6X5-GT:



G-6S

	6X5–GT. (Octal 6 pin base).	84, 84/6Z4. (5 pin base).
Pin 1.	No connection	Heater
Pin 2.	Heater	Plate
Pin 3.	Plate No. 2	Plate
Pin 5.	Plate No. 1	Cathode
Pin 7.	Heater	Heater
Pin 8.	Cathode.	

Type 84 is identical to type 84/6Z4, being a full-wave indirectly heated high-vacuum rectifier with a heater operating at 6.3 volts .5 amp. Type 6X5–GT is similar except that the heater current is .6 amp. The two types have the same voltage ratings but type 6X5–GT is capable of giving slightly more output current. In most cases the difference in heater current may be neglected and the two types may be treated as being electrically interchangeable although a change of socket is required. Type 6X5–GT has smaller overall dimensions than type 84/6Z4.

Type G84 is an obsolete directly heated full-wave vacuum rectifier having a 2.5 volt 1.5 amp. filament. It may be replaced by type 6X5–GT provided that the heater voltage is increased to 6.3 volts.

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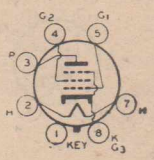
TYPE: 89.

Replace by Australian-made 6F6-G. RADIOTRON 6F6-G.

Different base connections. The diagram shows the use connections for type 6F6-G:

	89. (6 pin base).	6F6–G. (Octal 7 pin base).
Pin 1.	Heater	No connection
Pin 2.	Plate	Heater
Pin 3.	Grid No. 2	Plate
Pin 4.	Grid No. 3	Screen
Pin 5.	Cathode	Grid
Pin 6.	Heater	Heater
Cap.	Grid No. 1	Cathode.



G-7S

Type 89 is a triple grid power amplifier which may be connected as a class A triode (grids Nos. 2 and 3 tied to plate), class A pentode (grid No. 3 tied to cathode) or class B amplifier (grid No. 3 tied to plate, grids Nos. 1 and 2 tied together forming the control grid). As a class A triode amplifier type 89 may be replaced by type 6F6–G connected as a triode. except that the grid bias should be reduced from –31 to –20 volts. The power output and electrical characteristics are very similar. Type 6F6–G as a triode amplifier should have pins 3 and 4 connected together to form the plate.

Type 89 as a class A pentode may be replaced by type 6F6–G as a class A pentode provided that the grid bias is reduced from –25 to –16.5.

Type 89 as a class B amplifier may be replaced by type 6F6–G as a pentode or triode provided that the grid bias is increased so as to reduce the plate current to a very low value.

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General Technical advice is available, without charge, on all matters relating to valves and their application on enquiry by letter, telephone or personal interview from the Unified Sales - Engineering Service:—

Amalgamated Wireless Valve Co. Pty. Ltd.

"Wireless House," 47 York Street, Sydney, N.S.W.

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